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## Description

Device for the sorting of flat mailings

The invention relates to a device for the sorting of flat mailings, comprising pouches for individual mailings, circulating on a conveyor belt on two levels, the emptying of which may be controlled corresponding to the read target address and the sorting plan.

According to the prior art for sorting machines with circulating pouches (EP 0 708 693 B1, EP 0 820 818 A1), the mailings are loaded into the pouches at one position. The circulating pouches are opened as soon as the mailing has reached a predetermined end position. The pouches then move forward empty until they have reached the loading point, where they are once again loaded with a new mailing. Thus the pouches cover long distances empty, which reduces the throughput of the sorting machine. It would be more advantageous, therefore, to provide a loading point after each half circulation, for example, resulting in a reduction of the distances covered by the empty pouches. This is known per se when sorting parcels with tilting tray sorters but has not been used when sorting flat mailings, as loading the mailings at different points from a single feeder is too costly, or an operator would be necessary at each loading point (feeder area). Even with circulations on two levels, a loading point is only provided at one point (EP 0 708 693 B1). It would even be possible to carry out loading at this point on the other level, after half of the total circulation, but this has not been put into practice due to the high cost of loading on two levels, associated with space problems. Even loading from a

buffer with buffer pouches which circulate on one level is not possible in this case.

The object of the invention is to provide a device for sorting flat mailings with pouches circulating on a conveyor belt on two levels, with which either the throughput can be increased at the same circulating speed or, with the same throughput, either the circulating speed and/or the number of pouches can be reduced, without increased staff costs and with reduced additional equipment costs. In this connection, it is possible to carry out loading from a buffer with buffer pouches which circulate on one level.

The object is achieved according to the invention by the features of claim 1.

This particular layout of the conveyor belt allows a plurality of loading stations to be arranged adjacently on the lower level, although they feed into the circulation at a distance from one another around a circulation loop. This allows the loading stations and/or feeder areas to be operated with minimal use of operators.

Advantageous embodiments of the invention are shown in the sub-claims.

A buffer with circulating buffer pouches is advantageously provided between the two levels of the circulating pouches and which may be fed by one or more feeder stations with separating devices and subsequent reading devices and whose buffer pouches, which may be controllably emptied, transfer the mailings to the pouch loading stations. As a result, it is

possible to feed in the mailings from one or more separating devices, independently from emptying the pouches for sorting.

It is moreover advantageous to provide unloading stations, for the additional removal of mailings, which are located before the pouch loading stations in the direction of transportation, in the planar extension of the pouch loop, so that there is the possibility of further pouches being empty at the pouch loading stations.

The invention is described in more detail hereinafter in an embodiment with reference to the drawings, in which:

Fig. 1 is a diagrammatic side view of a device for sorting according to the order of distribution, with the loading of a collector belt subdivided into sections,

Fig. 2 is a perspective view of the sorting device with two levels and one bend,

Fig. 3 is a perspective view of the sorting device with two levels and two bends.

In this example, the mailings are sorted in a plurality of end positions assigned to the target addresses which are arranged along the straight sections below the circulations.

The mailings 4 are firstly separated from a stack in the known manner in a separating device 1. The receiver addresses of the mailings 4 are then recorded and identified in a reading device, not shown. The read mailings 4 are then conveyed to a buffer device 2. At this point each mailing 4 is conveyed into

a circulating buffer pouch 3 via a loading station, whereby these buffer pouches 3 may be controllably coupled to a circulating conveying means and may be controllably uncoupled from the conveying means and the transfer is carried out in the coupled state.

If, for throughput reasons, a plurality of separating devices 1 are provided, the mailings 4 are transported from each separating device 1 into the buffer pouches 3 via a separate loading station.

Due to the capacity of the buffer, it is possible to process further both an irregular incoming flow from the separating devices 1 and an outgoing flow which is not synchronized with the incoming flow and/or is irregular. The buffer pouches 3 can be controllably opened downwards in order to deposit the mailings 4 into empty pouches 6 of a further pouch loop 5 circulating below. In this connection, the pouches 6 are fixedly connected to the circulating conveying device. The pouch loop 5 and the buffer pouches 3 circulate in the same direction.

The mailings 4 are sorted according to the current sorting plan, with the mailings 4 falling downwards in a controlled manner into the sorting end positions 7 by opening the bottoms of the pouches 6.

In order to accommodate the sorting device on the smallest possible floor area, the pouch loop 5 passes through two levels. Parts of the pouch loop 5 are bent back over one another about horizontal axes: in principle, the pouch loop 5 has the path of horizontal figures of eight which have been bent where they cross and are surrounded at that point by the

buffer device 2. The actuators for opening the pouches 6 of the pouch loop 5 can be fixedly arranged.

According to Fig. 2, two adjacent level transitions are respectively diverted by  $540^\circ$  over the interior of the installation. Visible outside the sorting end positions, not shown for reasons of clarity, are two adjacent pouch loading stations 10 with outlets of the buffer device 2 for loading the pouches 6 on the lower level, unloading stations 11 for additionally removing mailings 4 from the pouches 6 according to specific sorting criteria and which are arranged before the loading stations 10, so that there is the possibility of further pouches 6 being empty at the loading stations 10, a loading station 12 for loading the buffer pouches with the mailings from the separating device 1 and an outlet 13 of the buffer device 2 for removing mailings which have been separated off.

In Fig. 3 a sorting device is shown with two sets of bends. The diversions, together with the level transitions, are also arranged adjacent to one another inside the circulation, whereby the outer diversions are  $540^\circ$  due to the changeover to the other side and the inner diversions, where the mailings move forward on the same side, are  $360^\circ$ . In this connection, after respectively  $1/4$  of the total circulation, a pouch loading station 10 is provided on the lower level, whereby the four loading stations are adjacent to one another (two on each side). In these examples the mailings circulate in the diversions in the same direction, which is not imperative, however.